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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,067	10/19/2001	John E. Madocks	10630/9	3885

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 02/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/036,067

Applicant(s)

MADOCKS, JOHN E.

Examiner

Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters “102” and “103” has been used to designate both “cathode” and “magnetic poles”. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 7 requires “The apparatus of claim 6 wherein at least one of the cathodes comprises a facing cathode surface having a shaped selected from the group consisting of: a point, a bevel, a rounded surface, a stepped surface, a ridged surface, and combinations thereof.” Applicant should amend claim 7 to read “shape” for proper grammar.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flemming (USPat. 3,955,118). Flemming teaches a Penning-type plasma treatment apparatus (Figure 1; column 1, lines 10-40) comprising:
- i. at least first (left side item 13; Figure 1; column 2, lines 50-65) and second (right side item 13; Figure 1; column 2, lines 50-65) cathodes separated by a gap (22), said first cathode comprising a first exposed cathode surface (horizontal portion on either side – facing a substrate), said second cathode comprising a second exposed cathode surface (beveled tapered portion on either side – facing a substrate), and said first exposed cathode surface oriented non-parallel to said second exposed cathode surface; a set of electromagnets (14; Figure 1; column 2, lines 50-65; column 3, lines 25-26) operative to generate a magnetic field exiting from one of the cathodes and entering the other of the cathodes, thereby crossing the gap; said magnetic field comprising a first magnetic field portion crossing the gap and passing through said first exposed cathode surface, at least one anode structure (52; Figure 1, 3; column 4, lines 21-24 – “used in place of anode 11”) positioned to create an electric field extending from the cathodes to the anode structure, at least a portion of said electric field crossing said magnetic field and forming a closed-loop electron containment region within said magnetic field – when anode 52 of Figure 3 is used in place of anode 11 of Figure 1, nearly identical structure is reached with applicant’s invention. As a result, when the structure recited in the reference is substantially identical to that of the claims, claimed

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properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

- ii. a sufficient voltage (24, Figure 1) between the anode structure and the cathodes operative to form a plasma (column 1, lines 10-40) within the magnetic field when a gas (25, Figure 1) is present near the containment region at a gas pressure between 0.1 and 100 mTorr – Flemming states that operation of the chamber 20 (Figure 1) is at a pressure of “1-100μm”. It is assumed that Flemming refers to 1-100μm of Hg at 0°C that is equivalent to the range of 1mtorr to 10 torr.
- iii. and at least one substrate (column 1, lines 10-40) positioned to be treated by said plasma
- iv. the substrate is positioned to be treated by the plasma with a treatment selected from the group consisting of: a chemical vapor deposition process, a surface modification process (“ion implantation”; column 1, lines 10-15, 43-50), an etching process, a sputter-coating process, and combinations thereof.
- v. the magnetic field comprises a mirror-type magnetic field at least in a peripheral portion of the magnetic field - when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).
- vi. the first exposed cathode surface extends over a length measured along the gap and a width measured transverse to the length
- vii. a set of ferromagnetic elements (“soft iron”; column 3, lines 24-26) magnetically coupled to the set of magnets to provide a ferromagnetic return magnetic path, thereby enhancing the magnetic field across the gap – Applicant identifies both cathode elements and ferromagnetic

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elements as item 103 as supported by Applicant's specification – Page 9, lines 18-20; Page 8, lines 28-30.

- viii. an enclosure (20, Figure 3) extending from the cathodes around a portion of the electron containment region positioned away from the substrate; and a source of process gas (25, Figure 1) positioned within the enclosure.
- ix. the source of process gas comprises a tube (42-44, Figure 3) positioned within the enclosure, said tube comprising a gas-release openings

Flemming does not teach said first magnetic field portion comprising magnetic field lines having a maximum field strength of at least 100 Gauss or the relative symmetry/asymmetry positions and strengths of the magnetic field lines. Flemming does not teach the relative dimensions of the cathode surfaces. Flemming does not teach cathodes are shaped such that the gap is wider at the ends than at the central portion. Flemming does not teach the location of the electron containment region. Flemming does not teach that an asymmetrical magnetic field is generated with respect to a central axis of the gap extending between the cathodes by altering the arrangement of the cathodes as supported by Applicant's specification (page 4, lines 21-24; Figure 14) thereby changing the position of the electron containment region. Flemming does not teach permanent magnets in place of his electromagnets.

Flemming does not teach that the source of process gas comprises an evaporation source or a sputter source, however, it is well established that apparatus claims must be structurally

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distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ." (emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Flemming does not teach that each of the cathodes comprises a plurality of segments positioned adjacent to one another along the length axis.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Flemming to optimize the shape, dimension, and position of the cathode electrodes and the coil current of his electromagnets.

Motivation for Flemming to optimize the shape, dimension, and position of the cathode electrodes and the coil current of his electromagnets is to optimize the plasma distribution relative to his apparatus and processed substrates. Additionally, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05). Regarding the shape and dimension of Flemming's electrodes, (In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.); MPEP 2144.04); It is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830,

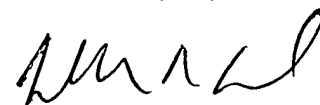
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225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPat. 4,314,180; 4,979,467; 3,786,258; 4,851,633; 5,627,435; 6,140,773; 4,303,865; 5,616,224; 6,137,231; 6,130,507; 6,444,945; .

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.



JEFFRIE R. LUND  
PRIMARY EXAMINER